

# 16th Annual Survey of Emerging Risks: Mid-Year Flash Report

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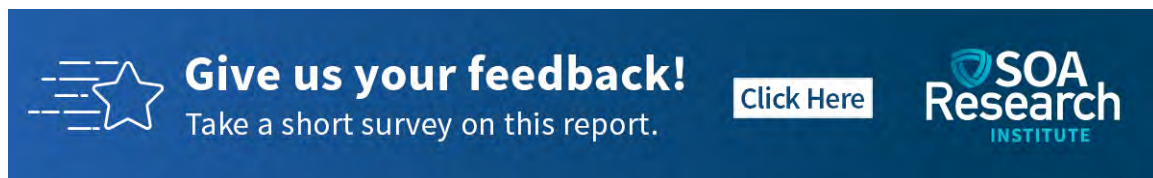


# 16th Annual Survey of Emerging Risks

## Mid-Year Flash Report

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# 16th Annual Survey of Emerging Risks

## Mid-Year Flash Report

### Introduction

Emerging risks are those that surprise, like Nassim Taleb's black swans, or evolve over time into more significant risks. The evaluation of an evolving risk can no longer use historical data without adjusting the information to recognize the changing nature of that risk. Examples would include wildfires driven by climate change and forest management practices, or energy prices driven by conflict and reaction to climate change.

The 16<sup>th</sup> *Survey of Emerging Risks*<sup>1</sup>, sponsored jointly by the Casualty Actuarial Society (CAS) and the Society of Actuaries (SOA) Research Institute, is part of an annual effort to identify the current thinking of risk managers about risk. As the pace of change and challenges to risk managers appears to be increasing, the data collected in November 2022 has been supplemented by a short flash survey in May 2023. Questions for the flash report were quantitative and designed for a quick response.

Survey questions focused on three ways of looking at risk:

- Top current risk (participants vote for one);
- Top five emerging risks (vote for five); and
- Top emerging risk (vote for one).

The 23 risks are presented to the participants, shown with definitions in Appendix I, and they can add an alternative risk. These risks are grouped into five categories: economic, environmental, geopolitical, societal, and technological. Results are trended from 2008. A user's guide was produced with the 15<sup>th</sup> survey that walked the reader through the data and showed how it could be used to incorporate foresight into risk analysis<sup>2</sup>. This flash survey also asked a unique two-part question about scenarios risk managers are concerned about and which ones were stress tested.

The May 2023 flash survey included 129 participants. The online survey was mostly spread across five practice areas and, among those who were risk managers, it was an experienced group.

Surveys are tied to their specific time and circumstances, with recency bias<sup>3</sup> always present. Except for the very first survey, conducted in the spring of 2008, all the other surveys were completed in the fall. It appears that the time of year impacts environmental risks, likely due to the Atlantic hurricane season occurring in the late summer and early fall.

This flash survey collected data early in the fourth year of the COVID-19 pandemic, during the Russian invasion of Ukraine but after food and energy supply chains showed their initial resiliency that surprised many. Some, but not all, countries showed progress against inflation.

The biggest impact on results was due to the release of artificial intelligence (AI) tools to the general public and was reflected in a surge of respondents choosing *Disruptive technology* to make it the highest positive mover for all

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<sup>1</sup> Rudolph, Max J. 16th Emerging Risk Survey. June 2023. <https://www.soa.org/resources/research-reports/2023/16th-survey-emerging-risks/>

<sup>2</sup> Rudolph, Max J. 15th Emerging Risk Survey. August 2022. <https://www.soa.org/resources/research-reports/2022/15th-survey-emerging-risks/>

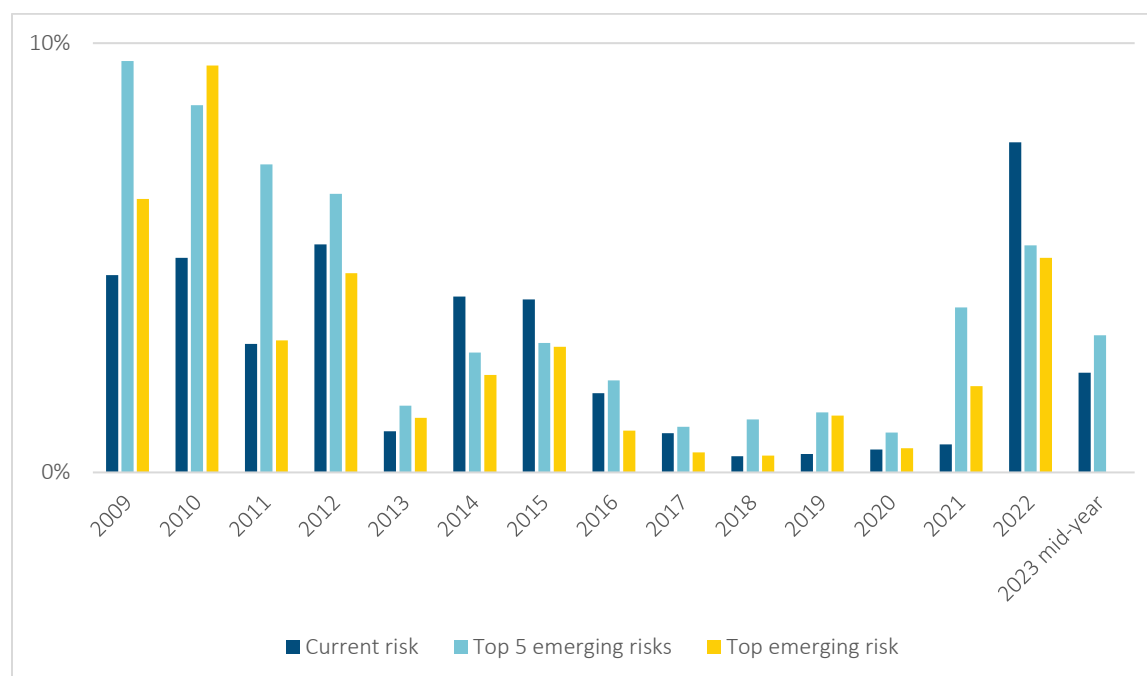
<sup>3</sup> Recency bias is a cognitive bias that overemphasizes the importance of recent events over older ones.

three questions. The *Energy price shock* showed similar consistent reductions in responses. Natural disasters, notably a major earthquake centered in Turkey and cyclones in the Pacific and Indian Oceans, had limited impact on the results.

The reader should remember that choices of one risk instead of another are relative—it does not necessarily mean that one risk has dissipated or increased from a prior survey, just that the chosen risk(s) are considered less or more important than the other choices at that point in time by a specific group of respondents.

In the previous survey, the *Energy price shock* risk spiked to levels not seen in over 10 years as concerns about the energy supply chain rose following Russia's invasion of Ukraine. As seen in figure 1, the percentage of risk managers who selected this risk for all three questions has reverted from late 2022 highs. It is no longer a top five risk for any of the questions tracked, and no respondents chose it as the top emerging risk. This risk seems to be one that was nudged aside due to other risks rather than a reduction itself.

**Figure 1**  
ENERGY PRICE SHOCK – HISTORICAL RESULTS, 2009–2023 MID-YEAR



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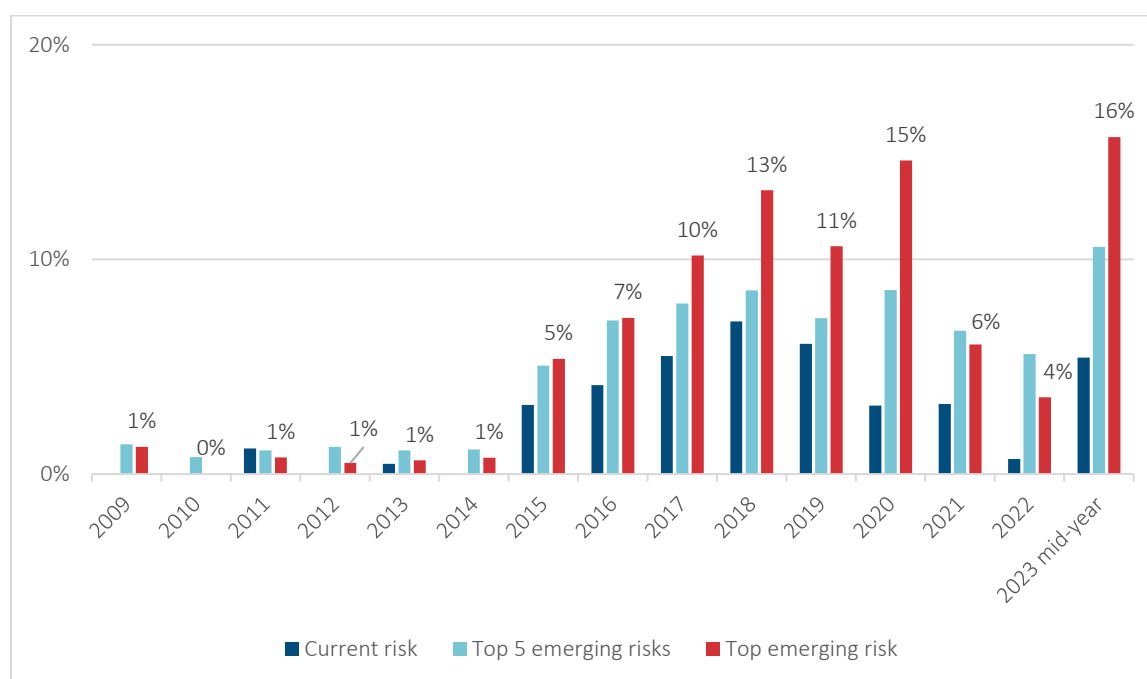
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## Key Finding 1: Risk Manager Concerns Focus on Disruptive Technology with Interesting and Conflicting Results for Financial Volatility

The first half of 2023 has seen convective storms and inland flooding, high numbers of tropical storms, Canadian wildfires and smoke impacting air quality around the Northern Hemisphere, continuing respiratory disease outbreaks, and geopolitical concerns around the globe. The first half of 2023 has seen a fascination/obsession of sorts around artificial intelligence as companies with exposure have been rewarded, while ethicists debate how the risk of runaway AI can be avoided. Unsurprisingly, the *Disruptive technology* risk spiked, but figure 2 shows the complex path taken over the history of the survey as self-driving cars, the human genome and other technological breakthroughs came into the public eye. During the pandemic, risk managers backed off the risk and showed how a survey of relative risks that are consistently in the spotlight could still be volatile<sup>4</sup>.

**Figure 2**

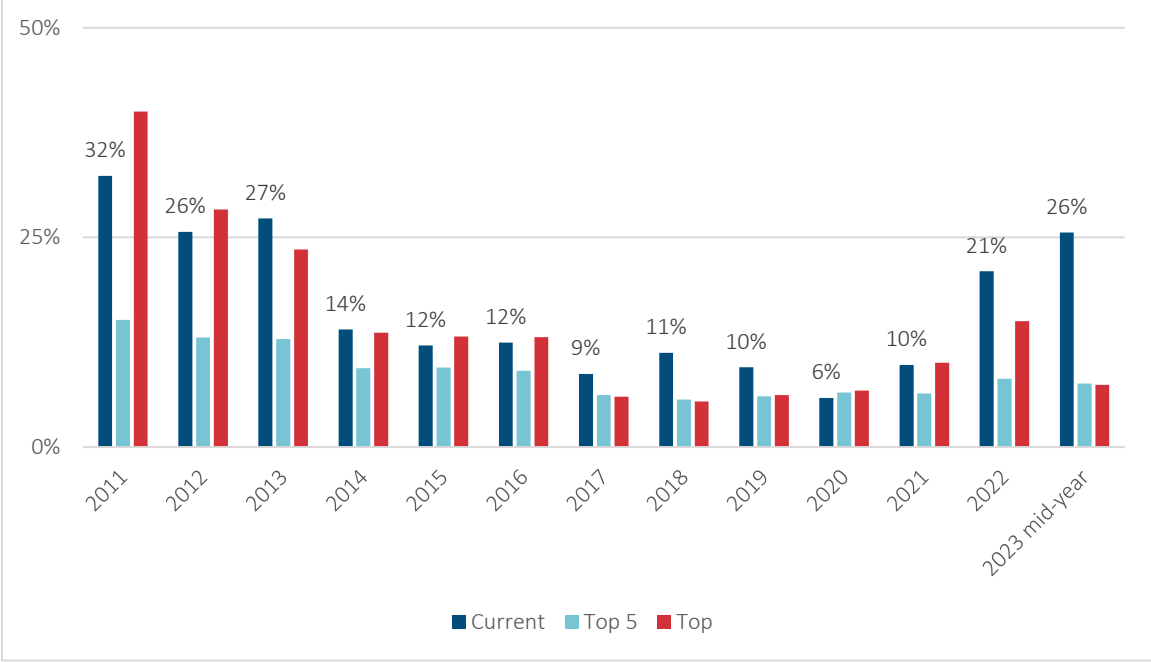
### DISRUPTIVE TECHNOLOGY – HISTORICAL RESULTS, 2009–2023 MID-YEAR



<sup>4</sup> Percentages for the top five emerging risks are based on the number of respondents, so they add up to more than 100%. Other results, except for rounding, total 100%. All values are absolute, i.e., none of the data reflects a percentage change from a previous result.

The *Financial volatility* risk continues its resurgence to be the top current risk, but dropped off from its 2022 high level for top emerging risk as seen in figure 3. It remained in the top five for all three questions asked in the mid-year flash survey.

**Figure 3**  
**FINANCIAL VOLATILITY – TOP EMERGING RISK, 2011–2022**



## Key Finding 2: Top Five Emerging Risks

The top choices were disrupted for the top five emerging risks question (the survey's primary metric) with *Disruptive technology* breaking into the top five by dislodging *Climate change* for the first time since 2018 to rank first for the survey's key metric (see table 1). *Demographic shift* fell from fifth to seventh and was the only risk to fall out of the top five.

**Table 1**

**TOP FIVE EMERGING RISKS, 2020–2023 MID-YEAR**

	2023 mid-year	2022	2021	2020
1	Disruptive technology	Climate change	Climate change	Climate change
2	Climate change	Wars (including civil wars)	Cyber/networks	Cyber/networks
3	Cyber/networks	Cyber/networks	Pandemics/infectious diseases	Pandemics/infectious diseases
4	Wars (including civil wars)	Financial volatility	Disruptive technology	Disruptive technology
5	Financial volatility	Demographic shift	Financial volatility	Financial volatility

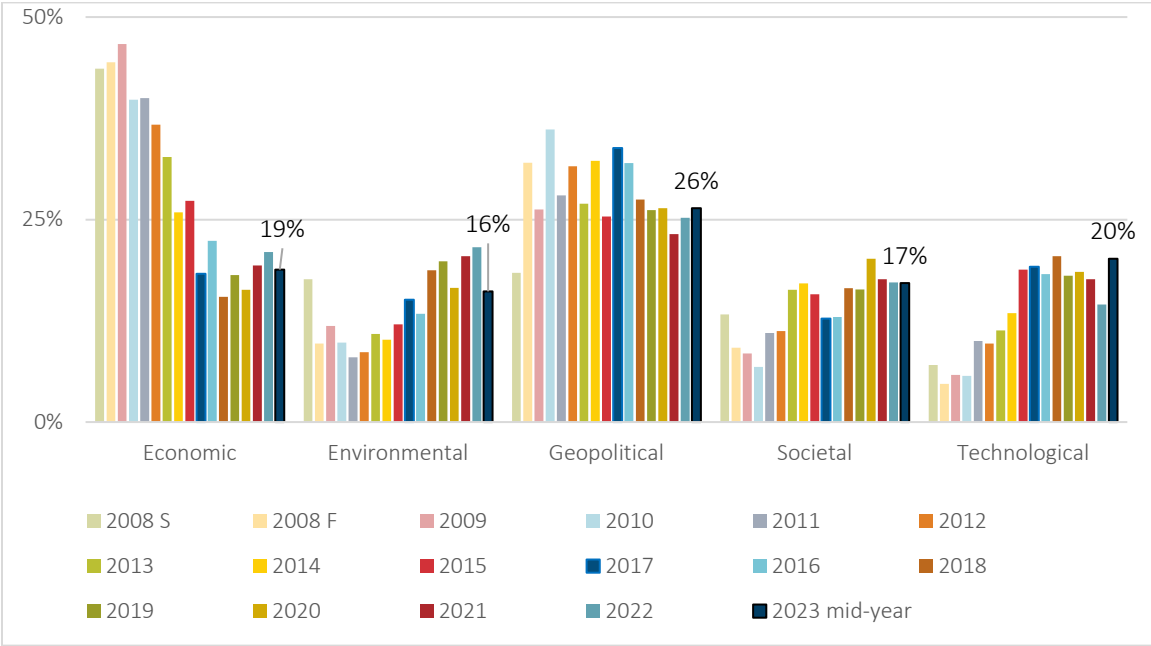
For the top five emerging risks in this year's survey, the geopolitical (up 1%) and especially technological (up 5% to its highest in five years) categories increased, societal was stable, and environmental (down 6% to its lowest since 2017) and economic (down 2%) fell as seen in figure 4<sup>5</sup>. Geopolitical remains the leading risk category with 26% of the top five emerging risks falling in that category, but the remaining four categories in a tight range from 16%-20%.

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<sup>5</sup> The current survey is a follow-up to the 16th iteration of the survey. The survey was completed twice in 2008 (spring, fall) and then annually.



**Figure 4**  
EMERGING RISKS BY CATEGORY (UP TO FIVE RISKS CHOSEN PER SURVEY)



Results for the top five emerging risks in figure 5 have been sorted based on results in the previous survey. Labels reflect the 2023 mid-year results. Several risks saw increases, namely *Disruptive technology* (22%), *Globalization shift* (6%), and *Transnational crime and corruption* (5%). These were offset by decreases in *Climate change* (11%), *Energy price shock* (10%), and *Natural catastrophe: severe weather* (6%). Some of these trends may be normal seasonal adjustments driven by recency bias since storms tend to be worst in the late summer and fall.

**Figure 5**  
YEAR-OVER-YEAR EMERGING RISKS (UP TO FIVE RISKS CHOSEN PER SURVEY), 2022–2023 MID-YEAR

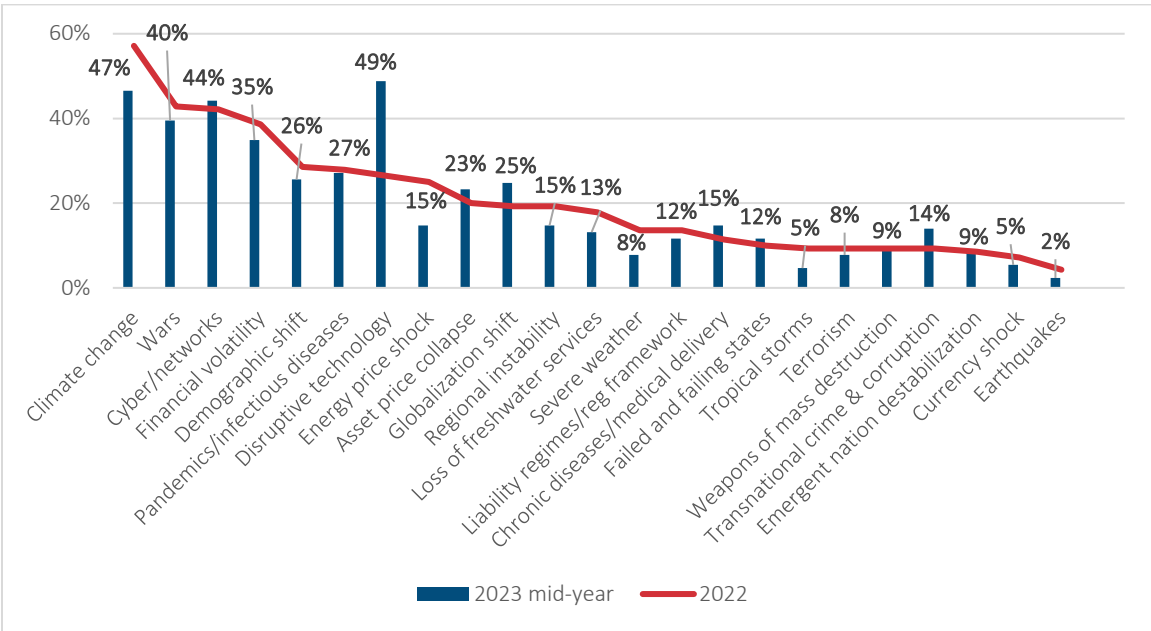
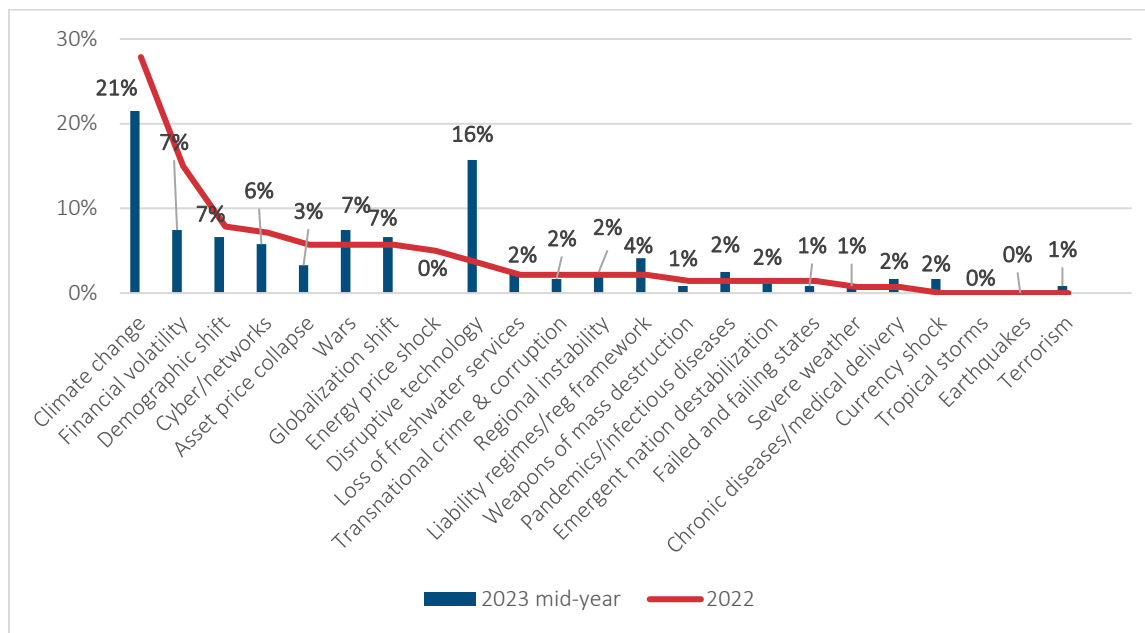


Table 2 shows the leading responses for top emerging risk. Figure 6 shows a comparison between results for the top emerging risk in the 2022 survey and the current 2023 mid-year flash survey. *Disruptive technology*, in second place overall, increased by 12% (four times the result in 2022) and was the only risk to increase more than 2%. *Financial volatility* (down 8% but still third overall), *Climate change* (down 6% but top ranked), and *Energy price shock* (down 5% to 0) fell by more than 2%.

**Table 2**  
**TOP EMERGING RISK**

Rank	Risk	2022 Rate	Mid-year 2023 Rate
1	Climate change	28%	21%
2	Disruptive technology	4%	16%
3T	Financial volatility	15%	7%
3T	Wars (including civil wars)	6%	7%
5T	Demographic shift	8%	7%
5T	Globalization shift	6%	7%

**Figure 6**  
**YEAR-OVER-YEAR TOP EMERGING RISK, 2022-23 MID-YEAR**



### Key Finding 3: Top Current Risk

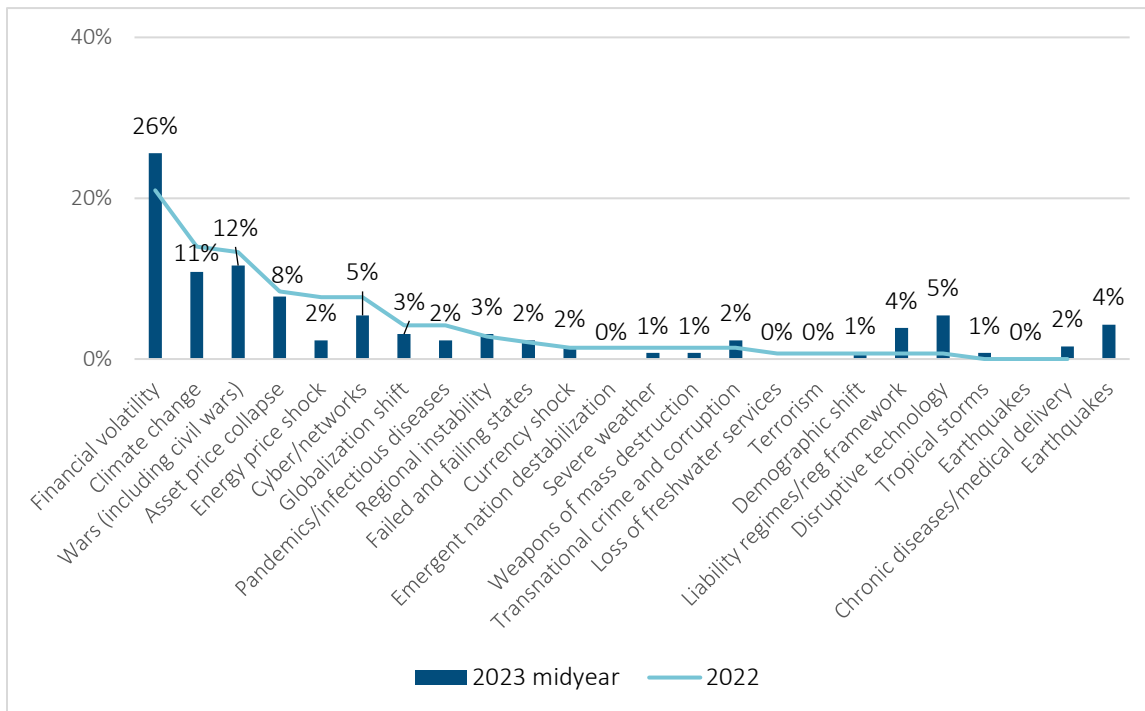
Table 3 includes the top ranked risks when respondents were asked for their top current risk. The risks that increased the most were *Disruptive technology* (5%, ranked fifth) and *Financial volatility* (5%, top ranked). Those falling the most were *Energy price shock* (5%) and *Climate change* (3% but still ranked third).

**Table 3**  
TOP CURRENT RISK

Rank	Risk	2022 Rate	Mid-year 2023 Rate
1	Financial volatility	21%	26%
2	Wars (including civil wars)	13%	12%
3	Climate change	14%	11%
4	Asset price collapse	8%	8%
5T	Cyber/networks	8%	5%
5T	Disruptive technology	1%	5%

The year-over-year comparison for top current risk is shown in figure 7. It is interesting to see several risks that were not chosen frequently in the fall of 2022 see material increases. This includes the least chosen risk in 2022, *Natural catastrophe: Earthquakes*, which increased from 0 to 4%, likely due to the major earthquake and aftershocks in Turkey early in 2023.

**Figure 7**  
YEAR-OVER-YEAR TOP CURRENT RISK, 2022-2023 MID YEAR



### Key Finding 4: Top Scenarios

A new set of questions asked what scenarios the respondents were most worried about in the current environment and which ones they stress tested. The greatest interest came from risks that were viewed as a concern but not stress tested. This may be a source of future investigation and research.

Figure 8 shows an imbalance for some risks, with stress testing exceeding the concern, such as *Pandemic* and *Liquidity* risk, or a shortfall such as *Political extremes* and *Generative artificial intelligence*. Only *Economic slowdown* and *Inflation* seem to have a healthy balance. A few respondents shared other scenarios they tested, including topics about national debt levels, U.S. loss of reserve currency status, defaults, interest rates, tax rates, and the default of an emergent nation.

**Figure 8**  
SCENARIOS AND STRESS TESTING

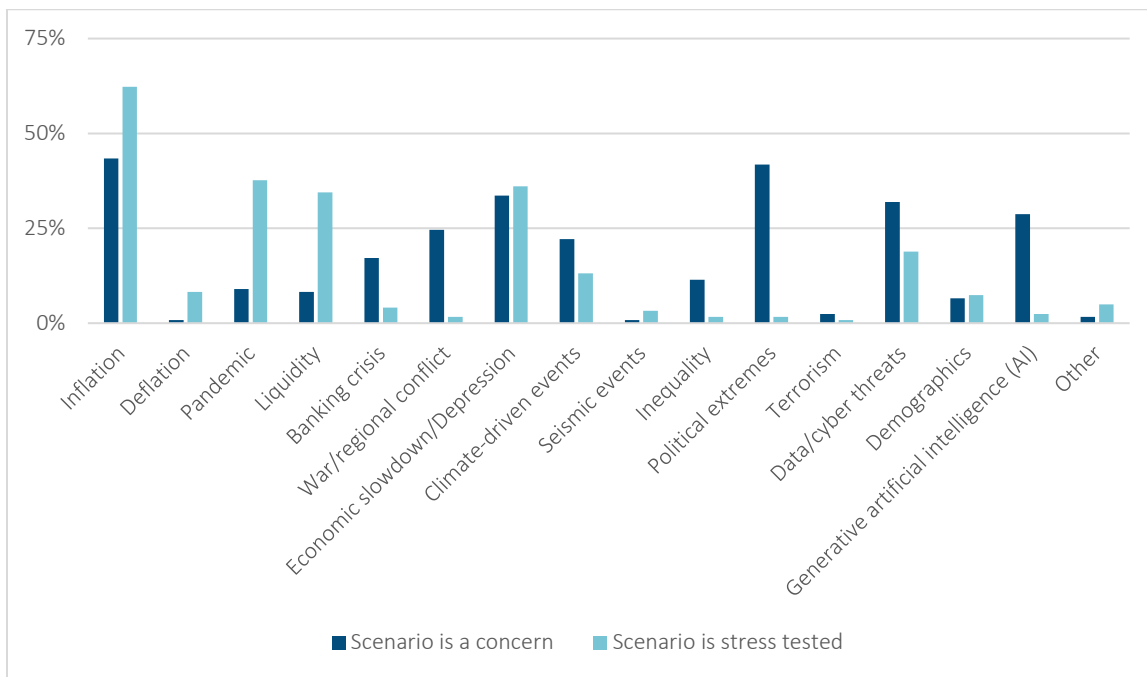


Table 4 ranks the scenarios by those of greatest concern for respondents, along with the percentage where stress tests have been performed. *Seismic events*, *Terrorism* and *Demographics* may all be topics that could be investigated through qualitative scenarios as each could impact the global ecosystem in a material way and multiple events like this could occur simultaneously or cluster over a short period.

**Table 4**

**TOP CONCERNS AND SCENARIOS STRESS TESTED**


Rank	Risk	Concern	Stress Test Performed
1	Inflation	43%	62%
2	Political extremes	42%	2%
3	Economic slowdown/depression	34%	36%
4	Data/cyber threats	32%	19%
5	Generative artificial intelligence	29%	2%

Risk managers reported that *Political extremes* was the top risk where they had created a scenario they were concerned with that was not being stress tested. Table 5 shows the top-ranked risks and can act as a guide for developing future narrative scenarios.

**Table 5**


**TOP CONCERNS THAT ARE NOT BEING STRESS TESTED**

Rank	Risk	Concern but not stress tested
1	Political extremes	41%
2	Generative artificial intelligence	26%
3	Data/cyber threats	25%
4	War	23%
5	Climate	18%



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## Acknowledgments

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## Appendix I: Glossary of 23 Risks Across Five Categories

### ECONOMIC RISKS

- Energy price shock—Price instability and extremes of energy prices.
- Currency shock—Material disruptions to currency equilibrium, including central bank devaluations (currency wars) and digital currencies.
- Emergent nation destabilization—Fast growing country’s economic growth slows, potentially as a result of protectionism, demographics, internal politics, or economic difficulties.
- Asset price collapse—The value of assets such as housing and equities collapses.
- Financial volatility—Price instability and extremes of sectors, including commodities, equities, or interest rates.

### ENVIRONMENTAL RISKS

- Climate change—Change in climate patterns generates both extreme events and gradual changes, impacting infrastructure, agricultural yields, soil degradation, ecosystem biodiversity (e.g., insects, shellfish), and human lives. Drivers of physical and transition risks include, but are not limited to, space weather and human influence.
- Loss of freshwater services—Water shortages impact agriculture, businesses, and human lives. Drivers include, but are not limited to, climate change and human influence (e.g., pollution).
- Natural catastrophe: tropical storms—Hurricanes, typhoons, and cyclones lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Natural catastrophe: earthquakes—Strong seismic/volcanic activity lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Natural catastrophe: severe weather—Meteorological phenomena lead to disruption, catastrophic economic losses, and/or high human loss of life. Includes inland flooding, tornados, thunderstorms, drought, wildfires, high winds, snowstorms, and dust storms.

### GEOPOLITICAL RISKS

- Terrorism—Attacks lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Weapons of mass destruction—Nuclear, biological, radiological, or chemical technologies lead to disruption, catastrophic economic losses, and/or high human loss of life.
- Wars (including civil wars)—Wars erupt between or within countries, leading to disruption, catastrophic economic losses, and/or high human loss of life.
- Failed and failing states—The trend of a widening gap between order and disorder or widening social rifts.
- Transnational crime and corruption—Corruption is endemic. Non-state entities successfully penetrate the global economy.
- Globalization shift—Preference changes to imports and immigration. Changes include populism, democracy, socialism, communism, religiosity, and political uncertainty. Countries retrench and become more nationalistic and protectionist or open up their economies to outsiders. Inequality, privacy and food insecurity challenge the concepts of fairness and egalitarianism.
- Regional instability—Unstable regions cause widespread political and other crises.

## SOCIETAL RISKS

- Pandemics/infectious diseases—A pandemic emerges with high mortality/incidence of diseases such as HIV/AIDS, Ebola, coronavirus, or influenza. Antimicrobial resistance becomes common.
- Chronic diseases/medical delivery—Diseases such as obesity, diabetes, cardiovascular, and substance abuse become widespread or treatments appear. Material changes to medical delivery or financing.
- Demographic shift—Evolving populations size and mix (e.g., age, size, race, migration, skills) drive changes in economic growth and levels of government intervention.
- Liability regimes/regulatory framework—Costs increase faster than GDP, with increases in the spread and size of litigiousness (e.g., social inflation, climate litigation) and speed of regulatory revisions. Material changes in tax policy.

## TECHNOLOGICAL RISKS

- Cyber/networks—A major disruption in the availability, reliability and resilience of critical information infrastructure caused by cyber risks, terrorist attacks, or technical failure. Results are felt in supply chains, major infrastructure: power distribution, water supply, transportation, telecommunication, emergency services, or finance.
- Disruptive technology—Unintended consequences of technology lead to abrupt change (e.g., drones, self-driving cars, additive manufacturing, internet of things, nanoparticles). Models become more complex but less descriptive over long time horizons.



## About the Casualty Actuarial Society

The Casualty Actuarial Society (CAS) is a leading international organization for credentialing and professional education. Founded in 1914, the CAS is the world's only actuarial organization focused exclusively on property and casualty risks and serves over 10,000 members worldwide. CAS members are experts in property and casualty insurance, reinsurance, finance, risk management and enterprise risk management. Professionals educated by the CAS empower business and government to make well-informed strategic, financial and operational decisions.

The purposes of the Casualty Actuarial Society are:

- To advance the body of knowledge of actuarial science applied to general insurance, including property, casualty and similar risk exposures
- To expand the application of actuarial science to enterprise risks and systemic risks
- To establish and maintain standards of qualification for membership
- To promote and maintain high standards of conduct and competence
- To increase the awareness of actuarial science
- To contribute to the well-being of society as a whole

In principle and in practice, the CAS values and seeks diverse participation within the property/casualty actuarial profession. In support of those values, the CAS encourages an inclusive community where differences are celebrated and all have the opportunity to participate to their fullest potential in its success. The CAS commits time and resources to accomplish this objective.

Actuaries are required to adhere to the high standards of conduct, practice and qualifications of the actuarial profession, thereby supporting the actuarial profession in fulfilling its responsibility to the public.

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## About The Society of Actuaries Research Institute

Serving as the research arm of the Society of Actuaries (SOA), the SOA Research Institute provides objective, data-driven research bringing together tried and true practices and future-focused approaches to address societal challenges and your business needs. The Institute provides trusted knowledge, extensive experience and new technologies to help effectively identify, predict and manage risks.

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